

Quality Assurance of Multimedia Learning Materials

(QAMLM –Version 1.0)

**Developed by
Commonwealth Educational Media Centre for Asia
India**

**In Collaboration with
Ministry of Higher Education, Malaysia**

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Foreword

On October 31, 2008, Commonwealth Educational Media Centre for Asia and the Ministry of Higher Education Malaysia, held a joint meeting at Kuala Lumpur released a draft document on Quality Assurance for Multimedia Learning Materials (QAMLM). The draft brings to culmination the efforts that the two core groups in India and Malaysia were engaged in the past one year. Over the next several months, the Groups expect to further refine the QAMLM draft into an integrated generic framework for quality assurance that each organization, institution or country can adapt to its own context. The thrust of the framework would be to guide the production of contextually relevant and quality multimedia learning material, acting as a self-evaluation system.

Based on the discussions of the draft, both groups will now revisit certain aspects of the current document to ensure that the final QAMLM version, slated for release in June 2009 at the Commonwealth Educational Ministers' Conference is clear, concise and easy to implement. Several other points of discussion like the desirable total number of key indicators, weightages accorded to each of these, foregrounding the gender perspective and the learner-centeredness will be addressed. Further, the document will also provide guidelines on how to use it and apply it to either to review existing materials or while undertaking the development of new material.

Even as the framework was getting firmed up, there was a strong sense that CEMCA should not only develop guidelines but also move towards a process of certification. However, as this does not fall under COL-CEMCA's current mandate or existing capacity, what COL would do to encourage widespread use of the guidelines as part of its overall commitment to quality assurance, would be (i) to hold regional workshops throughout the Commonwealth, (ii) build capacity in the implementation of the Guidelines where required and iii) do quality audits, if invited which could be a fee-for-service activity.

The whole process of developing the Guidelines has been one of consultation, collaboration and consensus and is a great example of south-south collaboration. It was also a professional development opportunity for all the experts and participants. The true impact of this collaborative work on the quality of multi-media content of course, will depend on how many professionals and institutions take ownership of this and make it an integral part of their own quality assurance processes.

I commend CEMCA for initiating this important process and completing it in record time and congratulate the core groups in India and Malaysia for their impressive and diligent work in taking it forward.

Asha Kanwar
Vice President, Commonwealth Of Learning

Introduction

The education scenario in most developing countries clearly indicates the challenges faced while providing access to education to a very large young population spread over small towns and remote areas with poor infrastructure.

Print is the mainstay of learning materials in most educational systems. However with recent developments in technology the availability of non-print materials has not only shown a dramatic increase, but the rate of growth is very high. The non-book materials earlier were limited to audiotapes and videocassettes, but with convergence of technologies, Multi-media has opened up new possibilities of Interactive media, online learning, live interactions etc. It can be used effectively in the teaching learning process. It supports individual and group learning activities through techniques, which refresh and reinforce classroom teaching, enriches & extends learning opportunities for students who have mastered the core subject area by providing access to resource bases (audio, video, text, graphics and animations and interactive assessment tools) and enhances learning experiences through simulations and by fostering collaborative learning. It makes an important contribution to the ideal of tailoring education methods more closely to individual learner needs and abilities.

Recent developments in technology have simplified the production equipment and processes enabling a large number of players to enter the content generation fray. Traditionally the infrastructure costs of video material production were prohibitive. Today, this cost has substantially reduced. The reduction in cost along with the availability of software generation packages has made the production process easier, encouraging a large number of agencies to enter the field.

However, all this has not necessarily resulted in production of better quality material. In fact there is a possibility that the bad may drive out the good. It is the consumer, who risks spending on low quality product or even worse using unauthenticated, inaccurate, educational material.

Interactive Multimedia will transform our capability to embrace an educational paradigm that deals with learning as a vital, fulfilling and continuing part of life at home and in the workplace as well as within educational institutions. As the importance of Multi-media based learning is only likely to increase, it is essential that attention is paid to its Quality: Assurance, Assessment, Certification, and Standards.

A fairly strong regimen of standards exists to ensure good quality interoperable multimedia hardware systems. But while the Technology standard is fairly well defined, there is hardly any attention paid to the pedagogic standards. The emphasis is on Technological wizardry rather than quality of learning experience or outcomes. Technological parameters are vital but educational experience and outcomes have to be the focus. Unfortunately there has not been any significant effort at assessment or certification of these aspects of Multi-media materials. The only area in which guidelines are available for generation of Multimedia materials is regarding Fair Use Guidelines which relates to IPR of these materials.

However development of Assessment methods and standards is a long drawn process, which must be accepted by the industry and must draw legitimacy not only because of the authority implementing agency but because of its usefulness to the industry and the society as a whole.

Standards are good for the economy, for the industry and for the consumer, as they tend to do some or all of the following.

- Standards define some of the characteristics of processes and/or products which should be followed to make them suitable for use, likely to succeed in the market, understandable to the consumer and consistent with offerings from other producers
- Standards code and diffuse state of the art technology and best practice
- Standards reduce transaction costs between different producers and between producers and customers
- Standards reduce risks as perceived by producers and by customers
- Companies that use standards perform better
- Standards can increase trade
- Standards help to build focus, cohesion and critical mass in the formative stages of a market
- Standards capture trends in customer demand
- Open standards are desirable to enable a competitive process of innovation-led growth
- There is an important "public good" aspect to standards
- Standards contribute to economic growth
- Standards help to protect a market against Gresham's Law (that bad drives out good)

Evolution of the QAMLM Process

In view of the need to develop assessments methods, and standards for multimedia materials, CEMCA initiated an activity in this field in the form of consultations with a small group of experts. The first Round Table of experts held at Bengaluru in August 2007, accepted the need to take up an activity of this nature and provided the following guidelines.

- It should be an inclusive process and shall involve all sections.
- It can start by defining best practices as guidelines and then work towards definition of standards and Certification process.
- There should be a continuous check with the market trends.
- There should be an international representation in defining the guidelines.

This was followed by a discussion with a large group discussion in October at New Delhi, including representatives of the Academia and Industry. It was felt that Quality Assessment, Standards, and Certification would be too wide a scope. Professionals from other countries like Malaysia and Sri Lanka were also invited to participate in the discussions. It was agreed that as a first step the project would only develop a framework and guidelines for Quality Assessment of Multimedia Learning Materials. Efforts would be made to make the parameters as objective as possible. The discussions also provided guidelines regarding some definitions like Multimedia Materials, Quality Assessment and overall scope of the project.

A core group of professionals was constituted with members drawn from academia, practitioners, open and distance learning institutions, and quality assessment and accreditation institutions. Over a period of one year, the group worked together evolving a framework for quality assurance and assessment. In parallel, a core group was constituted in Malaysia, that also worked on developing quality assurance and assessment parameters. Periodically, the two core groups met and also held wider consultations in both countries. What is presented in this document is the culmination of the efforts of the two groups, looking at the issue of quality assurance and assessment of multimedia learning materials (QAMLM). Subsequently it was

agreed that the Indian group will focus at the holistic process of quality assurance, intended more for developers of MLM while the Malaysian Group will focus on assessment parameters of MLM. Needless to say, both are interconnected, but also provide standalone guidelines for two different user groups defined as developers and users.

Scope

While defining the framework for the Quality assurance and assessment of educational materials a major factor had to be considered - Whether the focus of the guidelines would be e-learning or multimedia materials? The following points emerged from the discussions:

1. Multimedia-based learning may be a part of e-learning but the parametric set for defining effective e-learning and quality framework is much bigger and includes many other factors like Learning Management Systems, network robustness and delivery, content/course management systems, interactivity between the teacher and the learner as well as p2p (peer-to-peer) interactions through one or more networks for both synchronous and asynchronous modes of learning make e-learning a far more complex paradigm.
2. In a lot of the countries worldwide, especially developing countries, multimedia is primarily being used for learning and will continue to have relevance in the classroom for a long time.
3. Developing a complete framework for quality of e-learning content requires much more elaborate criteria that are standardized in the five stages as defined by the ADDIE (Analysis, Design, Development, Implementation and Evaluation) model. For example, design must permit interactivity among users and between users and the teachers. Development of content must allow for flexibility in learning content based on feedback by learners during the course of learning. Implementation must include some of the most relevant and evolving tools of LMS /CMS and Web 2.0 tools. Feedback analysis has to be far more comprehensive than what a tightly integrated Multimedia would provide for.

Therefore, CEMCA's initiative for a quality framework is restricted to Multimedia Learning Materials and is based on the ADDIE model. This was so as most of the developers of multimedia content follow this model. Thus the ADDIE model has been used as a generic framework.

The framework focuses on the five stages – Analysis, Design, Development, Implementation and Evaluation. It captures the major inputs and processes within each of these clusters, defines the

outcomes for all the inputs and sub-processes listed and finally provides guidelines on the quality indicators necessary for each of the outcomes that are listed. This framework will provide a sound base for all developers of multimedia content to define and enhance their product development life cycles.

The quality indicators defined are measurable. The measurement parameters for each indicator are defined in this document. While defining the measurement parameters for each of the quality indicators there were discussions on certain parameters which will prove to be pre-qualification criteria / zero-sum indicators for the developers. These could be having the requisite skill sets, having identified the learning domain correctly, having documented proofs for the process being followed, ensuring that the final product is IPR compliant, ensuring that product development always uses latest technology, that product development takes into account scalability as a key factor – especially to online delivery platforms.

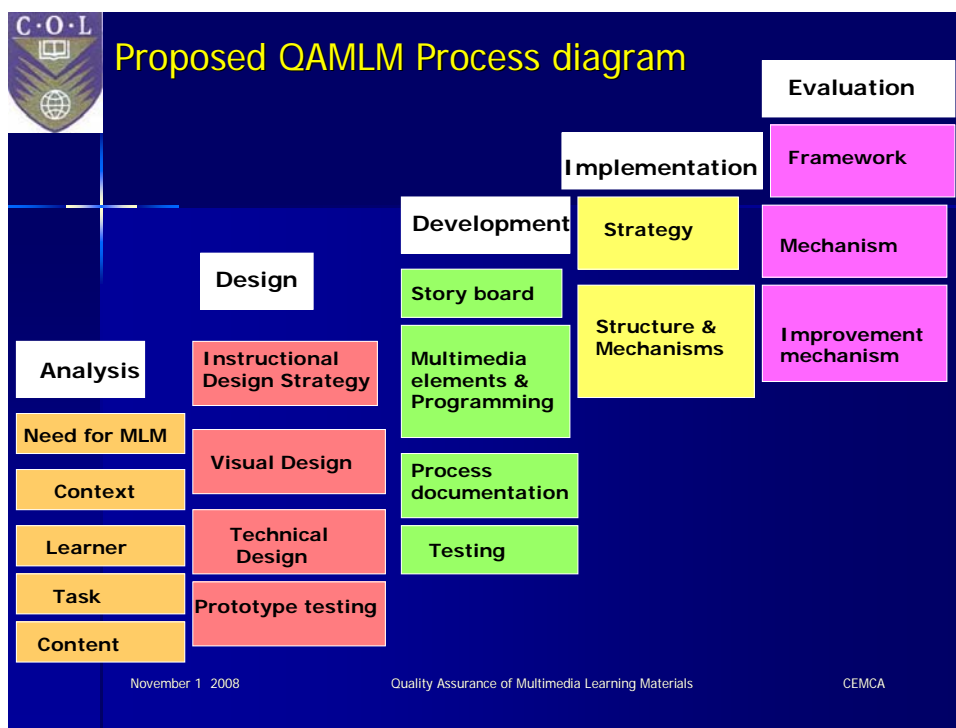
This framework will thus be tested with developers and industry to fine tune the outcomes and quality indicators listed.

The second part of this document is for the users - individual learners/teachers/institutions etc. It is also based on the ADDIE model. The framework in this section provides guidelines to users so that they select quality multimedia materials already available for use.

SECTION 1

QUALITY FRAMEWORK FOR DEVELOPMENT OF MULTIMEDIA LEARNING MATERIALS

Proposed QAMLM Process Diagram



Quality Framework for Development of MLM

The ADDIE framework that has been adopted for this project has five stages of activities – Analysis, Design, Development, Implementation and Evaluation. The input processes and sub-processes have been identified for each of the activities and the outcomes listed leading the possible quality indicators as given the table below. A brief scope of each activity is elaborated in the framework. For details regarding each of the stages please refer to Annexure I.

Analysis Phase – Captures requirements, Sets expectations

Prior to developing any multi-media materials several questions – relating to the target audience, the nature of MLM, the learning styles, the conditions under which utilized, the purpose for the MLM and the nature of the content – need to be answered. Unless there is clarity on these and several related issues the compatibility between the MLM and the learner may not be achieved. Analysis hence should capture the requirements and set expectations of the MLM. A study of analysis may be carried under five heads: needs, context, learner, task and content. These analyses would provide important inputs into design, development, implementation and assessment considerations.

Design phase – Sets the blueprint, defines the framework

The Design phase considers three sub-processes Instructional Design Strategy, Visual Design and Technical Design. The quality indicators reflect key points for each sub-process. Though the focus of this document is Multimedia Learning Materials (MLMs), the Technical Design provides indicators w.r.t compatibility for online delivery requirements and use of latest developments in technology. Considerations for online delivery requirements is an optional requirement, but is defined as quality indicators to suggest scalability of a product. An important consideration for the various sub processes in the Design phase is that various strategies are contextually relevant, gender and racially sensitive.

Development phase – Creation, assembly and integration of media elements

One of the important considerations for the Development phase would be that the media elements are IPR free or due credit is given in the MLMs. This would be a pre-requisite for any quality certification.

The second point is that the development is based on Design decisions. Some of the quality indicators clearly state this requirement.

Implementation, which provides the *raison d'être* of QAMLM, is where the product is put into action. This entails attention to two key areas; detailing an implementation strategy and putting the required structures and mechanisms in place. Taking a holistic view of presenting the QAMLM as a solution to learning problem, a quality assurance mechanism then must provide guidelines and indicators for both these stages. Typically, a comprehensive strategy document would involve specifying delivery mechanisms in terms of hardware and software requirements, identifying training needs for different users groups like learners, facilitators etc. An important aspect of a well thought out strategy would be the extent to which technical hurdles at the operational level are anticipated and provided for and building into the strategy a notion of time required to complete the implementation process. The next critical part of implementation, deals with which actually putting the structures and mechanisms in place. The quality assessment framework identifies the activities that needs to be in place answering questions of the “what needs to be done” and the indicators provide a measure to answer the “how has it been done” type of questions.

Evaluation phase – Measure effectiveness, Recommendations for product improvement

This phase covers various aspects related to the instructional, visual, technical design, pedagogy and costs etc. A framework has to be developed for effective assessment while ensuring adequate budgetary provisions are made for the same, and that allows both formative and summative Evaluation. Prototype testing thus would form an important approach right from the design stage itself.

QAMLM Framework

Based on ADDIE: Analysis-Design-Development-Implementation-Evaluation

Activity	Input and/or Processes	Outcomes	Quality Indicators
I] ANALYSIS			
1.1 Need	Defining the learning needs Identifying the needs from the perspectives of different stakeholders (learners, teachers, subject experts, industry / practitioners, policy makers) Incorporating inputs from studies (primary and secondary)	Need assessment statement / document	1.1 Needs are clearly stated and comprehensive 1.2 Needs are appropriately prioritised
1.2 Context	Collecting data on contextual variables Learning Environment <ul style="list-style-type: none"> • Individual/Group • Formal / Informal • Facilitated / Self-learn • Individual/Group Technical facilities <ul style="list-style-type: none"> • Access to internet • Software / Hardware specifications • Independent/shared computers Socio-cultural aspects	Contextual profile	1.3 Context is clearly and fully mapped
1.3 Learner	Collecting Data with respect to learners vis-à-vis academic levels and attributes like skills, motivation, visual literacy, language competency, learning styles, special needs (differently-abled) etc.	Learner Profile	1.4 Learner profiles are adequately captured

1.4 Task	Stating purpose(s) of the MLM <ul style="list-style-type: none"> • Education, • Training, • Enrichment, • Awareness, • Skill development • Any other 	Task definition documents	1.5 Primary purpose of MLM is clearly stated.
	Identifying usage aspects of MLM as standalone/series, supplementary, integrated and/or any other		1.6 Usage aspects of MLM are clearly specified.
1.5 Content	Creating content-outline	Content outline	1.7 Content outline is indicative of the scope of the MLM.
	Generating content for design (raw content) Verify that content is cognitively appropriate, factually accurate, complete, sensitive and inclusive (gender, class, caste, religion, ethnic groups, environmentally etc.)	Appropriately validated raw Content	1.8 Raw Content has been validated for appropriateness and accuracy.
	Classifying content into facts, concepts, principles, processes, procedures and/or any other Identifying Learning Domains as cognitive and/or effective and/or psychomotor	Identified Learning domain Classified Content.	1.9 Content is accurately classified for design treatment as per learning domain

II] DESIGN			
2.1 Instructional Design Strategy	Stating learning Objectives	Defined learning objectives	2.1 Objectives are clearly defined, achievable, relevant and measurable.
	Structuring Content logically and ensuring that it is cognitively appropriate <ul style="list-style-type: none"> • Simple to complex • Known to unknown • Concrete to abstract • General to specific 	Content map	2.2 Content is pedagogically structured, logically sequenced and consonant with learner profile
	Specifying Instructional Strategies <ul style="list-style-type: none"> • Macro • Micro 	Strategy Statements	2.3 Instructional Strategy is clearly stated, appropriate, achievable and compliant with 'Analysis' requirements
	Selecting of media mix <ul style="list-style-type: none"> • Audio • Videos • Text • Graphics • Animations • Simulations 	Media Mix	2.4 Media mix is appropriate, engaging and consonant with objectives
	Specifying Learner Evaluation Strategies <ul style="list-style-type: none"> • Practice • Assessment – computer marked and tutor marked • Games & quizzes • Pre-test • Post-test • Remedial • Others 	Evaluation Scheme	2.5 Learner Evaluation Scheme includes a variety of assessment techniques and is consonant with the learning objectives.

2.2 Visual Design	Designing GUI	Prototype Graphical User Interface (GUI)	2.6 The GUI Design is intuitive, visually appealing and consistent
	Deciding on Fonts <ul style="list-style-type: none"> • Type • Size • Compatibility (language, special characters, symbols etc) 	Prototype Screens	2.7 Fonts are legible and visually appealing
	Planning Layouts <ul style="list-style-type: none"> • Information hierarchy display • Placement of elements 	Prototype Layouts	2.8 Layouts are clearly defined and reflect information hierarchy
		Prototype - Visuals	2.9 Content, visuals, and instructional strategy are contextually relevant, gender and racially sensitive
2.3 Technical Design	Preparing a Technical Design with due attention to: <ul style="list-style-type: none"> ➤ Configuration ➤ Usage Scenario ➤ Navigation ➤ OS considerations ➤ File Size ➤ Compliance to Standards 	Prototype Technical Design	<p>2.10 Technical design is consonant with 'Analysis', 'Instructional Strategy' and 'Visual Design' requirements</p> <p>2.11 The technical design reflects the latest developments in technology</p> <p>2.12 Technical Design is compatible with on-line delivery requirements</p>
2.4 Prototype Testing	Field Testing of the prototype with the target audience and experts	Test Report - Recommendations for modifications (Measure of acceptability of prototype elements)	2.13 Prototype Testing shows the effectiveness of Instructional Design strategy', 'Visual design' and 'Technical design'

III] DEVELOPMENT			
3.1 Story boards	Storyboard Writing	Storyboards	<p>3.1 Storyboard follows a Structure Map, Objectives and defined Instructional strategies</p> <p>3.2 Storyboard uses simple, correct and clear language</p> <p>3.3 Instructions provided in the storyboard to the developers are unambiguous and detailed</p>
3.2 Multimedia elements and Programming	Production of media elements – audio, video, text, graphics, animations as applicable Programming and integration of all media elements into a cohesive multimedia package	Multimedia package <ul style="list-style-type: none"> • Alpha version • Beta version Final Master with support documents	<p>3.4 MLM is validated by subject experts</p> <p>3.5 MLM is compliant with specified standards</p>
3.3 Process Documentation	Process Documentation	Process Documents (like graphic and media checklists, email communication specifying - folder structures, process flow for the development team, strategy documents etc.)	3.6 Process Documents facilitates easy and quick development of MLM
3.4 Testing	Product Testing	Test Reports	3.7 MLM testing in a simulated environment satisfies overall performance requirements

IV] IMPLEMENTATION			
4.1 Strategy	Detailing an implementation strategy that specifies: <ul style="list-style-type: none"> ○ Delivery mechanisms in terms of hardware and software requirements ○ Training requirements for trainers /facilitators ○ Orientation required for learners including supplementary material (e.g. booklets, reference material etc) ○ Identifying and anticipating technical hurdles ○ Timelines 	A comprehensive implementation strategy document	4.1 Implementation strategy provides clear roadmap for execution 4.2 Instructional manuals are self-explanatory, applicable and usable 4.3 Timelines for implementation are appropriate and realistic
4.2 Structure and mechanism	<ul style="list-style-type: none"> ● Putting infrastructure and systems in place ● Training of facilitators ● Preparing learners 	<ul style="list-style-type: none"> ● Infrastructure and delivery mechanisms in place ● Trained facilitators ● Oriented learners 	4.4 Appropriate structure and resources are in place for implementation 4.5 Facilitators are empowered for implementation. 4.6 Learners are adequately oriented.

V] EVALUATION			
5.1 Evaluation Framework	Developing an Evaluation framework which <ul style="list-style-type: none"> • States/outlines the Evaluation scope and objectives • Develops Evaluation tools • Follows standard procedures • Deciding trained evaluators • Has scope for budgetary provisions 	Evaluation process/ design document	5.1 Evaluation strategy is clearly outlined 5.2 Evaluation process is rigorous and as per standard procedures
5.2 Evaluation mechanism	Collecting data Analysing learner satisfaction, expert endorsement and fitness for purpose Preparing report	Evaluation Report on Product Effectiveness	5.3 Institutional mechanisms required for evaluation are specified 5.4 Evaluation tools are objective, valid and reliable
5.3 Improvement mechanism	Utilizing feedback	Recommendations for product modifications	5.5 Provision for feedback and improvement is made

Quality Indicators and Measurement

In the present Framework developed on the lines of the ADDIE model of Instructional Design already explained earlier, an attempt has been made to identify the core components / key ideas that reflect Quality with respect to each Activity and sub-activity. The specific approach adopted when developing the **Quality Indicators** (QI) has been as follows:

- To identify all the major issues that have a bearing on the perceived Quality of the MLM at each stage of its development.
- To prepare an elaborate, though not exhaustive, list of pointers of Quality, taking care to avoid redundancy as well as duplication.
- To state the Quality Indicators using simple, unambiguous language that captures the essence of what reflects quality.
- To develop a set of Indicators that not only help to identify whether Quality is present or absent, but also pave the way for assessing the extent or degree to which a certain Quality Indicator is present. (i.e. to facilitate an understanding not merely of whether something has been done but how well it has been done).

Based on the Quality Indicators finalised after intensive deliberations and scrutiny as to whether each Indicator is a needed, relevant and critical component of Quality, the next step taken was to develop a scale of **Assessment** for each. While recognizing the fact that a good indicator of Quality need not always be quantitative, in order to provide a readily usable, uniform format that is consonant with the approach adopted by most Quality Assurance agencies and one that permits objective comparisons between different MLMs, a **five-point scale** has been developed for each Quality Indicator. The lowest end of this Scale (Level 1) corresponds with the Verbal descriptor, 'Poor', and the highest point (level 5) represents the 'Excellent' level. The five point scale used for each QI and the progression implied from one level to the next is as given:

1. Poor ----- generally representing absence or non-existence or no consideration given to a certain QI.
2. Average ----- indicating few components, partial presence or marginal consideration given to a certain QI
3. Good -----indicating presence of or consideration given to many components of the QI
4. Very Good-----suggesting presence of or consideration given to most (almost all) of the important components of the QI

5. Excellent ----- indicating presence of / consideration to all the components of the QI PLUS some value addition (e.g. facilitating / providing direction to the next steps in the development of MLM).

While in the present form, no weight ages have been assigned to the Quality Indicators, the approach for the future could be towards assigning differential weight ages to the different QIs depending on their relative importance in the overall development of MLM, and arriving at activity wise weighted numerical scores.

I ANALYSIS

1.1 Needs are clearly stated and comprehensive.

- | | | |
|---------------------|---|---|
| 1. Poor | : | Needs are not stated and stakeholders are not defined. |
| 2. Average | : | Needs are somewhat clearly stated, but stakeholders are not defined. |
| 3. Good | : | Needs are clearly stated and few stakeholders are defined. |
| 4. Very good | : | Needs are very clearly stated and most stakeholders are well defined. |
| 5. Excellent | : | Needs are very clearly stated and all stakeholders are very well defined. |

1.2 Needs are appropriately prioritised.

- | | | |
|---------------------|---|---|
| 1. Poor | : | Needs are not prioritised / wrongly prioritised. |
| 2. Average | : | Needs are prioritised to some extent, but inputs used are not clear. |
| 3. Good | : | Needs are prioritised to a large extent and indicate usage of some inputs. |
| 4. Very good | : | All needs are prioritised and indicate usage of most inputs. |
| 5. Excellent | : | All needs are appropriately prioritised and indicate usage of all inputs (primary and secondary). |

1.3 Context is clearly and fully mapped.

1. **Poor** : Context is not mapped.
2. **Average** : Context is somewhat clear, but only partially mapped. (e.g. learning environment mapped but socio-cultural aspects and /or technical facilities not considered).
3. **Good** : Context is clear, though not fully mapped.(e.g. Learning environment mapped and technical facilities determined, but socio-cultural aspects not considered).
4. **Very good** : Context is very clear and well mapped. (e.g. Socio-cultural aspects well mapped along with the learning environment and technical aspects).
5. **Excellent** : Context is very clear, well mapped and is clearly reflected in the profile document so as to guide the Design and Development stages.

1.4 Learner profiles are adequately captured.

1. **Poor** : Learner profile is not captured.
2. **Average** : Learner profile is partially captured. (e.g. Academic level of the learner determined, but learner attributes not considered).
3. **Good** : Learner profile is captured to a large extent. (e.g. Academic level and attributes considered, but learners with special needs not considered).
4. **Very good** : Learner profile is well-captured and the need for inclusiveness is emphasised. (Learners with special needs also considered).
5. **Excellent** : Learner profile is very well-captured and reflects how it will impact the Design and Development stages.

1.5 Primary purpose of MLM is clearly stated.

1. **Poor** : Purpose of MLM is not stated.
2. **Average** : Purpose of MLM is stated, but not clear.
3. **Good** : Purpose of MLM is clear, but task is not defined in detail.
4. **Very good** : Purpose of MLM is clear and task is defined in detail.
5. **Excellent** : Purpose of MLM is clearly stated with task well defined and includes

suggestions for treatment at Design and Development stage.

1.6 Usage aspects of MLM are clearly specified. (e.g. standalone / series, supplementary, integrated and/or any other).

1. **Poor** : Usage aspects of MLM are not indicated.
2. **Average** : Usage aspects of MLM are indicated, but not clear.
3. **Good** : Usage aspects of MLM are clearly stated, but do not include additional suggestions/details.
4. **Very good** : Usage aspects of MLM are clearly stated and include suggestions for treatment.
5. **Excellent** : Usage aspects of MLM are clearly stated, include suggestions for treatment and reflect how they will impact the Design and Development stages.

1.7 Content outline is indicative of the scope of the MLM.

1. **Poor** : Content outline is not given.
2. **Average** : Content outline is given, but only partially indicates the scope of the MLM. (Few titles/sub-titles given).
3. **Good** : Content outline is given and indicates the scope of the MLM to a large extent. (Most titles / sub-titles are given and clearly placed).
4. **Very good** : Content outline is well given and clearly indicates the scope of the MLM. (All titles / sub-titles are clearly given and placed in logical / natural sequence / hierarchy).
5. **Excellent** : Content outline is well given, clearly indicates the scope of the MLM and incorporates suggestions that impact the Design and Development stages.

1.8 Raw content has been validated for appropriateness and accuracy.

1. **Poor** : Raw content has not been validated for appropriateness and accuracy. (e.g. features like logical sequencing, following content outline, factual correctness, inclusiveness, etc., not considered).
2. **Average** : Raw content has been only partially validated for appropriateness and accuracy. (Only a few features considered and checked).

3. **Good** : Raw content has been validated to a large extent for appropriateness and accuracy. (e.g. Content outline is well followed and checked for appropriateness and completeness).
4. **Very good** : Raw content has been almost fully validated for appropriateness and accuracy. (e.g. content outline, factual correctness and completeness are considered and checked).
5. **Excellent** : Raw content has been fully and thoroughly validated for appropriateness and accuracy. (All features like content outline, logical sequencing, completeness, factual correctness, sensitivity and inclusiveness are considered and checked).

1.9 Content is accurately classified for design treatment as per learning domain.

1. **Poor** : Content is not classified and learning domain is not identified.
2. **Average** : Content is classified, but learning domain is not identified.
3. **Good** : Content is classified and learning domain is identified, though not appropriately.
4. **Very good** : Content is classified accurately and learning domain identified appropriately.
5. **Excellent** : Content is accurately classified, learning domain is appropriately identified and suggestions for Design and Development treatment are given.

II DESIGN

2.1 Objectives are clearly defined, achievable, relevant and measurable.

1. **Poor** : Objectives are not defined at all.
2. **Average** : Objectives are stated, but are not properly defined.
3. **Good** : Objectives are clearly defined and achievable.
4. **Very good** : Objectives are clearly defined, achievable and relevant.
5. **Excellent** : Objectives are clearly defined, achievable, relevant and measurable.

2.2 Content is pedagogically structured, logically sequenced and consonant with learner profile.

1. **Poor** : Content does not reflect pedagogical structure, logical sequence and consonance with learner profile.
2. **Average** : Content marginally reflects pedagogical structure, logical sequence and consonance with learner profile.
3. **Good** : Content reflects good pedagogical structure, though logical sequence and consonance with learner profile are marginally reflected.
4. **Very good** : Content reflects very good pedagogical structure and logical sequence, though consonance with learner profile is marginally reflected.
5. **Excellent** : Content reflects very good pedagogical structure, logical sequence and consonance with learner profile.

2.3 Instructional Strategy is clearly stated, appropriate, achievable and compliant with 'Analysis' requirements.

1. **Poor** : Instructional strategy is not stated.
2. **Average** : Instructional Strategy is stated, but not clear.
3. **Good** : Instructional Strategy is clearly stated and is appropriate.
4. **Very good** : Instructional Strategy is clearly stated, appropriate and achievable.
5. **Excellent** : Instructional Strategy is clearly stated, appropriate, achievable and compliant with requirements captured in the "Analysis" phase.

2. 4 Media mix is appropriate, engaging and consonant with objectives.

1. **Poor** : Media mix is neither appropriate, nor engaging and does not reflect consonance with objectives.
2. **Average** : Media mix is appropriate, but not engaging and does not reflect consonance with objectives.
3. **Good** : Media mix is appropriate and engaging, but does not reflect consonance with objectives.
4. **Very good** : Media mix is appropriate, engaging and reflects consonance with objectives.
5. **Excellent** : Media mix is appropriate, engaging, and consonant with objectives

and is very well integrated in the product.

2.5 Learner Evaluation Scheme includes a variety of assessment techniques and is consonant with learning objectives.

1. **Poor** : Learner evaluation scheme is not outlined.
2. **Average** : Learner evaluation scheme is outlined, but includes a limited variety of assessment techniques and does not reflect consonance with learning objectives.
3. **Good** : Learner evaluation scheme includes a fair variety of assessment techniques and reflects consonance with a few learning objectives.
4. **Very good** : Learner evaluation scheme includes a large variety of assessment techniques and reflects consonance with most learning objectives.
5. **Excellent** : Learner evaluation scheme includes a large variety of innovatively conceived assessment techniques and reflects consonance with all learning objectives.

2.6 The Graphical User Interface (GUI) Design is intuitive, visually appealing and consistent.

1. **Poor** : GUI Design is not included as part of the process.
2. **Average** : GUI Design is included, but is not intuitive, visually appealing and consistent (with respect to use of colour, style etc).
3. **Good** : GUI Design is intuitive, but not visually appealing and consistent.
4. **Very good** : GUI Design is intuitive and visually appealing, but not consistent.
5. **Excellent** : GUI Design is intuitive, visually appealing and consistent.

2.7 Fonts are legible and visually appealing.

1. **Poor** : Legibility of fonts (size, type, language, etc) and visual appeal (colour, style, etc) are not given consideration.
2. **Average** : Legibility of fonts is somewhat considered, but visual appeal is not given consideration.
3. **Good** : Fonts are legible and appropriate, but visual appeal is only marginally considered.
4. **Very good** : Font legibility and visual appeal are adequately considered. (Font colours communicate information hierarchy).
5. **Excellent** : Font legibility and visual appeal are adequately as well as appropriately considered. (Font colors communicate information hierarchy and overall technicalities with respect to fonts are also considered).

2.8 Layouts are clearly defined, consider all elements and reflect information hierarchy.

1. **Poor** : No thought is given to layouts
2. **Average** : Layouts are defined, but not clear and do not reflect information hierarchy and consideration of all elements. (e.g. video windows, pop-ups etc).
3. **Good** : Layouts are clearly defined and marginally reflect information hierarchy, but do not consider all elements.
4. **Very good** : Layouts are clearly defined, largely reflect information hierarchy, but do not consider all elements.
5. **Excellent** : Layouts are clearly defined, fully reflect information hierarchy and consider all elements appropriately.

2.9 Content, visuals, and instructional strategy are contextually relevant, gender and racially sensitive.

1. **Poor** : Content, visuals and instructional strategy are not contextually relevant and sensitivity to gender and race is not observed.
2. **Average** : Content, visuals and instructional strategy are contextually relevant to some extent, but sensitivity to gender and race is not observed.
3. **Good** : Content, visuals and instructional strategy are contextually quite relevant and slight sensitivity to gender and race is observed.
4. **Very good** : Content, visuals and instructional strategy are contextually relevant as well as gender and racially sensitive.
5. **Excellent** : Content, visuals and instructional strategy are contextually relevant, gender and racially sensitive and the visual style is both relevant and innovative.

2.10 Technical design is consonant with 'Analysis', 'Instructional Strategy' and 'Visual Design' requirements.

1. **Poor** : Technical Design does not reflect consideration of 'Analysis', 'Instructional Strategy' and 'Visual Design' requirements.
2. **Average** : Technical Design reflects marginal/slight consideration of 'Analysis', 'Instructional Strategy' and 'Visual Design' requirements. (Few requirements considered).
3. **Good** : Technical Design reflects considerable consideration of 'Analysis', 'Instructional Strategy' and 'Visual Design' requirements. (Many requirements considered).
4. **Very good** : Technical Design reflects consideration of all (explicit and implicit) 'Analysis', 'Instructional Strategy' and 'Visual Design' requirements.
5. **Excellent** : Technical Design reflects consideration of all explicit and implicit requirements, is well documented and uses innovative design approaches to take care of requirements.

2.11 The technical design reflects the latest developments in technology.

1. **Poor** : The Technical Design does not reflect the use of the latest developments in technology.
2. **Average** : The Technical Design reflects limited use of the latest developments in technology.
3. **Good** : The Technical Design reflects considerable use of the latest developments in technology.
4. **Very good** : The Technical Design reflects adequate and effective use of the latest developments in technology.
5. **Excellent** : The Technical Design reflects effective and innovative use of the latest developments in technology to meet overall requirements and create new paradigms in learning.

2.12 Technical Design is compatible with on-line delivery requirements.

1. **Poor** : Technical Design does not consider on-line delivery requirements.
2. **Average** : Thought appears to be given to on-line delivery requirements but does not translate in the technical design clearly.
3. **Good** : Technical Design reflects compatibility / scalability to on-line delivery requirements
4. **Very good** : Technical Design reflects compatibility / scalability to on-line delivery requirements and documents the format changes required.
5. **Excellent** : Technical Design reflects compatibility / scalability to on-line delivery requirements and documents the format changes required. Uses innovative techniques to make the content compatible with on-line delivery.

2.13 Prototype Testing shows the effectiveness of 'Instructional Design Strategy', 'Visual Design' and 'Technical Design'.

1. **Poor** : Prototype testing is not done at all.
2. **Average** : Prototype Testing though conducted shows that Design decisions are not in accordance with requirements.
3. **Good** : Prototype testing shows that Design decisions are in accordance with requirements, but require enhancements in all the three design areas.
4. **Very good** : Prototype Testing shows that Design decisions are in accordance with requirements but require slight enhancements in one or more of the design areas.
5. **Excellent** : Prototype Testing shows that Design decisions are in accordance with requirements and no further enhancements are required for firming up the design.

III DEVELOPMENT

3.1 Storyboard follows a Structure Map, Objectives and defined Instructional Strategies.

1. **Poor** : Storyboard is not based on a defined Structure, Objectives and Instructional Strategies.
2. **Average** : Storyboard is based on a defined Structure, but is not based on Objectives and does not follow defined instructional strategies.
3. **Good** : Storyboard is based on a defined Structure and Objectives, but does not follow the defined instructional strategies.
4. **Very good** : Storyboard is based on a defined Structure, Objectives and defined Instructional Strategies.
5. **Excellent** : Storyboard effectively follows a Structure Map, Objectives and defined Instructional Strategies and is exceptional.

3.2 Storyboard uses simple, correct and clear language.

1. **Poor** : Storyboard is poorly written; uses unclear and incorrect language.
2. **Average** : Storyboard reflects marginal attention to simple, correct and clear language.
3. **Good** : Storyboard uses simple, correct and clear language, but lacks effectiveness.
4. **Very good** : Storyboard uses simple, correct and clear language that is effective and engaging.
5. **Excellent** : Storyboard uses simple, correct and clear language effectively, reflects a fine command over the language and uses an innovative approach.

3.3 Instructions provided in the storyboard to the developers are unambiguous and detailed.

1. **Poor** : Instructions for developers are not provided in the storyboard.
2. **Average** : Instructions are provided for the developers in the storyboard, but they lack clarity.
3. **Good** : Instructions provided in the storyboard for developers are clear and unambiguous.
4. **Very good** : Instructions provided in the storyboard for developers are clear and detailed, but require some briefing to be given to the development team.
5. **Excellent** : Instructions provided in the storyboard are unambiguous, self-explanatory and detailed (No briefing is necessary for the developer)

3.4 MLM is validated by subject experts.

1. **Poor** : MLM is not validated by experts.
2. **Average** : Few sections of the MLM (approx. 40%) are finally validated by experts
3. **Good** : Many sections of the MLM (approx. 60%) are finally validated by experts
4. **Very good** : Most sections of the MLM (approx. 80%) are validated by experts
5. **Excellent** : The entire MLM is finally validated by experts and sign-offs are received from them.

3.5 MLM is compliant with specified standards.

1. **Poor** : MLM is not compliant with specified standards.
2. **Average** : MLM shows marginal compliance with specified standards.
3. **Good** : MLM shows moderate compliance with specified standards.
4. **Very good** : MLM is compliant with specified standards and is used for product effectiveness.
5. **Excellent** : MLM reflects an innovative solution with reference to compliance with specified standards

3.6 Process Documents facilitate easy and quick development of MLM.

1. **Poor** : Process documents are not available.
2. **Average** : Process documents are available, but not adequate
3. **Good** : Process documents are available for the entire development process and they record procedures and details.
4. **Very good** : Process documents are available for the entire development process, record procedures and details and are used to facilitate the easy and quick development of MLM.
5. **Excellent** : Process Documents are available for the entire development process, are well-formatted, permit easy retrieval and access and facilitate quick development of MLM.

3.7. MLM testing in a simulated environment satisfies overall performance requirements.

1. **Poor** : MLM testing reports do not exist.
2. **Average** : Testing reports exist, but are incomplete.
3. **Good** : Testing reports indicate that testing has been done in a simulated environment.
4. **Very good** : Testing reports indicate that testing has been done in a simulated environment and satisfy overall performance requirements.
5. **Excellent** : Testing reports not only indicate that testing has been done in a simulated environment and satisfy overall performance requirements but also check on other indicators that may prove conducive to enhancing the learning experience.

IV IMPLEMENTATION

4.1 Implementation strategy provides clear roadmap for execution.

1. **Poor** : Implementation strategy is not specified.
2. **Average** : Implementation Strategy exists but covers only some aspects of implementation. (e.g. delivery mechanisms and hardware /software requirements).
3. **Good** : Implementation Strategy is clear and includes key aspects of implementation like hardware, software requirements, training manuals and learner guides.
4. **Very good** : Implementation Strategy provides all the key elements, including suggested resource allocation and timelines, checklists and trouble-shooting tips.
5. **Excellent** : Implementation Strategy provides a step-by-step road map for effective implementation that is complete in all respects.

4.2 Instructional manuals are self-explanatory, applicable and usable.

1. **Poor** : Instructional manuals are not provided.
2. **Average** : Some instructional manuals are provided but are sketchy and inadequate and not readily usable.
3. **Good** : Instructional manuals are reasonably detailed, but not self-explanatory.
4. **Very good** : Instructional manuals are self explanatory, applicable and usable.
5. **Excellent** : Instructional manuals are self-explanatory, applicable, usable, anticipate most user queries and provide “frequently asked questions” type of guidelines and help.

4.3 Timelines for implementation are appropriate and realistic.

1. **Poor** : Timelines for implementation are not indicated. (users/implementers get no clue about how long it would take to implement the learning solution).
2. **Average** : Timelines though indicated, do not appear to consider implementation issues in an appropriate and realistic manner.
3. **Good** : Timelines appear appropriately indicated and to some extent, realistic. (Many implementation issues are anticipated.)
4. **Very good** : Timelines appear appropriate and realistic and indicate that all implementation issues have been identified and addressed.
5. **Excellent** : Timelines are appropriate and realistic and are supplemented by an implementation schedule to help the actual process of implementation.

4.4 Appropriate structure and resources are in place for implementation.

1. **Poor** : Resources have not been allocated and Structure is not put in place for implementation.
2. **Average** : Resources allocated and Structure put in place for implementation, are inadequate.
3. **Good** : Resources have been allocated to a considerable extent and Structure has many elements in place.
4. **Very good** : Resources allocated are adequate and Structure has all elements in place for good implementation.
5. **Excellent** : Resource allocation and Structure put in place are exemplary, reflecting a conducive / enabling learning environment.

4.5 Facilitators are empowered for implementation.

1. **Poor** : No attempt to empower Facilitators for implementation is observed. (Facilitators not identified or trained).
2. **Average** : Limited attempts to empower Facilitators for implementation are observed. (Facilitators identified, but no training provided to them.)
3. **Good** : Facilitators are identified and some basic training is provided to them, though not adequate for implementation.
4. **Very good** : Facilitators are identified and are well trained for implementation.
5. **Excellent** : Facilitators are well selected, trained and motivated for achieving the maximum benefit from the MLM.

4.6 Learners are adequately oriented.

1. **Poor** : No attempt at orienting learners is observed.
2. **Average** : Learners are given a broad idea of what to expect, but are not given proper orientation.
3. **Good** : Learners are well briefed about what to expect and how to approach the MLM.
4. **Very good** : Learners are well oriented; know how to go about the MLM and all applicable supplementary material is in place.
5. **Excellent** : Apart from being well-oriented, Learners have been enthused and motivated to explore the MLM and derive the maximum benefit from the MLM.

V EVALUATION

5.1 Evaluation strategy is clearly outlined.

1. **Poor** : Evaluation strategy is not outlined.
2. **Average** : Evaluation Strategy exists but covers only some aspects of the Evaluation framework.
3. **Good** : Evaluation Strategy is clearly stated and takes into account many key aspects of the Evaluation framework
4. **Very good** : Evaluation Strategy is clearly stated and covers most key aspects of the Evaluation framework
5. **Excellent** : Evaluation Strategy is clearly stated and comprehensively covers all key aspects of the Evaluation framework.

5.2 Evaluation process is rigorous and as per standard procedures.

1. **Poor** : Evaluation process is not rigorous and does not follow standard procedures.
2. **Average** : Evaluation process follows standard procedures.
3. **Good** : Evaluation process is rigorous and follows standard procedures.
4. **Very good** : Evaluation process is rigorous, follows standard procedures and is well documented.
5. **Excellent** : Evaluation process is rigorous, follows standard procedures, is well documented and provides clear guidelines for future development.

5.3 Institutional mechanisms required for evaluation are specified.

1. **Poor** : Institutional mechanisms required for evaluation are not specified.
2. **Average** : Institutional mechanisms required for evaluation are specified to some extent but some components are lacking (e.g. mechanism for data collection / analysis for studying learner satisfaction is available, but no such mechanism for expert endorsement).
3. **Good** : Institutional mechanisms required for evaluation are specified for most components, but not in detail.
4. **Very good** : Institutional mechanisms required for evaluation are specified in

detail for all components. (e.g. Mechanisms for Analysis of learner satisfaction, expert endorsement as well as fitness for purpose appropriately specified.)

5. **Excellent** : Institutional Mechanisms required for evaluation are appropriately and comprehensively specified for all components and they contribute to preparing an evaluation report on product effectiveness.

5.4 Evaluation tools are objective, valid and reliable.

1. **Poor** : Evaluation tools do not indicate any consideration given to objectivity, validity and reliability.
2. **Average** : Evaluation tools indicate slight consideration given to objectivity, validity and reliability.
3. **Good** : Evaluation tools indicate considerable attention given to objectivity, validity and reliability, but a systematic and integrated approach is lacking.
4. **Very good** : Evaluation tools are systematically developed with adequate and appropriate attention to objectivity, validity and reliability.
5. **Excellent** : Evaluation tools are systematically developed, tested out and contribute in generating objective, valid and reliable data.

5.5 Provision for feedback and improvement is made.

1. **Poor** : No consideration is given to collecting feedback from any source.
2. **Average** : Slight provision is made for collecting feedback from some sources.(e.g. provision for feedback from learners, but not from experts)
3. **Good** : Provision is made for collecting feedback from a variety of sources, but no thought is given to its utilisation for improvement/modification of MLM.
4. **Very good** : Provision for feedback collection from a variety of sources and systematic mechanism for improvement/modification based on it is outlined.
5. **Excellent** : Provision for feedback collection is made, improvement mechanism is outlined and requisite resource allocation is in place so that Feedback flows back into the system.

SECTION 2

QUALITY FRAMEWORK FOR ASSESSMENT OF MULTIMEDIA LEARNING MATERIALS

Introduction

Multimedia learning materials can be defined as the combination of various digital media types, such as text, images, sound and video, into an integrated multi-sensory interactive application or presentation to convey a message or information to learners that promotes effective learning (Neo and Ken, 2001). It is an important component in e-learning or distance learning. Studies have shown that MLM has a huge impact on the outcome of learning. A well designed MLM can promote better performance among learners. MLM that are designed using good teaching methodologies and instructional models can have a positive impact on the learners. MLM can be engaging, while simulated experiment and game-based learning can be fun for learners.

Today, large investments are made on the developing MLM for teaching and learning. For example, as one of the flagship programme of the Multimedia Super Corridor (MSC), RM300m was allocated for smart schools where it involved the development of MLM for schools (Puteh & Vicziany, 2004).

E-learning or distance learning can be supported by multimedia-rich content. It deploys videos, audios, animations, chats, interactive contents and other collaborative contents. The use of MLM makes learning interesting and fun. Hofstetter (1995) defined interactive multimedia as "the use of a computer to present and combine text, graphics, audio and video, with links and tools that let the user navigate, interact, create and communicate."

As more MLM are being developed, it becomes important to determine the quality of these products. Users need a guide to select and use these products. Users also need to know the quality of these products. Adopting poor quality content can result in poor performance of the learners and subsequently increasing the drop-out rate.

Type of MLM product addressed by this framework

The type of MLM product referred here is the finished MLM used for the purpose of teaching and learning. The guidelines for the assessment of MLM is provided for MLM related to teaching and learning rather than other type of content such as for advertisement-based or entertainment.

Definition of Assessment

Assessment can be defined as evaluating the appropriateness of the material for the purpose. Formative assessment involves the judgment of the effectiveness and efficiency of the development process. Summative assessment involves the assessment of the completed MLM products.

In formative assessment, the purpose is to improve the product during the development stage. Normally, the guidelines serve as a strategy or plan that can be used to improve the product.

In summative assessment, the finished product is evaluated. The purpose of summative assessment will be to make a decision to whether to adopt the product or, in some cases, to grade the product. The summative assessment determines the quality of the finished product. As MLM development are slowly taken over by production company and publishers, summative assessment becomes more important to users, who could be students, teachers or other stakeholders.

Summative Assessment

In summative assessment, a set of criteria is needed to evaluate the finished products. Clear distinction must be made between context depended and context independent criteria. Context dependent criteria are those that depend on the users. Example, content designed for children will

be not acceptable for adults. Distinction should also be made between objective and subjective criteria. For example, subjective criteria would be like defining the colour or style.


Assessment Criteria

The following criteria were identified as important for the summative assessment:

- **Desired Learning Outcomes**
The DLO of the MLM must be clearly stated. User must be aware of the purpose of content that they are accessing. The DLO stated must clearly indicate the target audience, degree and conditions.
- **Language**
The language used must be appropriate to the users. If children are the users, the language must be simple and clear. The content must be free from spelling and grammar mistakes.
- **Pre-requisite**
Pre-requisite of the content must also be clearly stated so the users know the expectations. In some cases, the pre-requisite may be determined through a pre-test. In this case, the user can be directed to the appropriate content.
- **Content: accuracy and factual**
The content must be clearly represented. It should not provide room for misinterpretation. The content must also be accurate and factual.
- **Content: meet objectives**
The content must ensure that it covers the objectives stated. It should not deviate from the objectives of lesson.
- **Content: Coverage**
The content must be sufficient to cover all the learning outcomes of the lesson.
- **Content must be structure**
The content must be well structured. A specific sequence must be followed when presenting the online materials. For example, the content can be presented from simple to more difficult or from early dates to current date.
- **Clear Instructions**
The content must provide clear instruction to the users. Very often, many of the instructions in e-content are assumed and they are not clearly stated. Efforts must be taken to ensure all instructions are clearly and accurately indicated.
- **Understandability**
The content must be easy to follow and understand. The target audience must be clearly defined so that the content can match. For example, the content for children should be different from adults. Content designed for one culture may not be suitable to another culture. Assessment must be done for a specific target audience.
- **Different learning styles (Diversity)**
The content must have diversity. Different type of activities must be promoted and the delivery of content must have different styles. It should not be monotonous and boring.
- **Interactivity**
The content should be interactive. Users should play an active role in the learning process rather than being passive. The content must be learner-centred.
- **Technology**
The technology adopted must be appropriate to the learning objectives. Internet provides a wide range of technologies for learning. Designers must try to incorporate the technology with purpose.
- **Interface must be user-friendly**
The interface must be user-friendly, that is, it must follow the designs used in some common applications such as MS Office. Standard icons and menu structure must be followed. User should be able to use the content with minimal training.
- **Aesthetics**
The aesthetics and layout of the content must be pleasing. Although, this criteria can be subjective, features such as consistency, standard symbols or icons, and standard template should be promoted and can be used as the key features for Aesthetics.

- **Biasness**
The content must be free from biasness such as gender, race, religion or culture. Efforts must also be made to localize the content.
- **Use of fonts/colour**
The font size and colour must be appropriate to facilitate learning (reading from the screen). Small fonts and bright colours can create eye-stress and may result in shorter engagement of learners with the lesson.
- **Assessment**
The content must provide at least an assessment to engage the students' performance. Feedback must be provided for the assessment.
- **Collaborative Learning**
With greater emphasis on collaborative learning or e-learning 2.0, content should promote collaborative learning activities.
- **Support**
The content should provide sufficient support to the users. Learners who have difficulty may drop the course if sufficient support is not provided. The response time for the support must also be good.
- **Degree of conformance to SCORM Standards**
The content must conform to SCORM 2004. SCORM will ensure reliability, re-usability, accessibility and future prove.
- **Degree of conformance to Web Standards**
If the content is to be deployed over the web, it must be ensure that web standards are followed. The current web standard is Web 2.0.
- **Degree of adoption to Open Standards**
Open standards are becoming a trend. Open standards will ensure integration of the content with other system. Open standards may also reduce cost of implementation.
- **Accessibility of content**
Accessibility of content is vital. If learners are unable to access the content or have difficulty to access the content, there is a great potential that learners will drop-out from the course. System with response time of more than 5 min are considered to inaccessible while a response time of less than 10s is considered very good.
- **Instructional Design Strategy**
The content must reflect the ID strategy or plan so that the learning experience can be promoted. The content must adopt one of the many ID strategy.
- **Handicap**
Does the content provide support for different handicap people?
- **Content has been endorsed or verified by SME**
All content should be endorsed or verified by a SME. In some cases, we can have more than one SME to verify the content. The SME must be qualified person.
- **Reliability of content**
A proven content would acceptable to many users. Proven content can be measured by the number of organisations that have installed it. The greater the number of users, the more reliable the content is.
- **Upgradeable**
Content cannot be perfect when it is first developed. Few iteration are needed before the content can be perfected. Thus, continuous upgrade is needed to improve the product. In some case, content can be automatically look for upgrades and install them over the web.
- **Originality**
The content must not infringe any of the copyright law.
- **Overall Design**
The overall design for content must be good, i.e. good colour for text, and box

As some of the criteria can be subjective, guidelines are provided to minimise the subjectivity. The assessment guide for MLM that follows provides some useful guide to the evaluator or stakeholders.



Pre-requisite Data for Assessment of MLM (Draft 1.0)

Section A: Information on MLM			Comments
A1	Reference Code:		
A2	Module Title:		
A3	Subject Area:		
A4	Coverage:		
A5	Keywords:		
A6	Language:		
A7	Target audience:	<input type="checkbox"/> Pre-school <input type="checkbox"/> Primary School <input type="checkbox"/> Lower Secondary School <input type="checkbox"/> Upper Secondary School <input type="checkbox"/> University <input type="checkbox"/> Post-Graduate <input type="checkbox"/> General Public <input type="checkbox"/> Special Needs (specify: _____) <input type="checkbox"/> Others (specify: <u>e.g.</u> <u>Farmers</u> _____) <input type="checkbox"/> Not Stated	

A8	Min. Hardware Requirements Stated:	<input type="checkbox"/> RAM Stated <input type="checkbox"/> Processor Stated <input type="checkbox"/> HDD Stated <input type="checkbox"/> Multimedia Requirements Stated (e.g. CD/DVD, Speakers, Mic, etc.) <input type="checkbox"/> Internet Speed Stated <input type="checkbox"/> Others Requirements Stated (Specify: _____) <input type="checkbox"/> Not Stated	
A9	Min. Software Requirements Stated:	<input type="checkbox"/> OS Stated (e.g. windows version) <input type="checkbox"/> Browsers Version/Type <input type="checkbox"/> Plug-in software stated <input type="checkbox"/> Other software requirements (Specify: _____) <input type="checkbox"/> Not Stated	
A10	Context of Usage:	<input type="checkbox"/> Support Self Learning <input type="checkbox"/> Support Facilitated Learning	
		<input type="checkbox"/> Support Individual Learning <input type="checkbox"/> Support Group Learning	
		<input type="checkbox"/> Support Formal Learning <input type="checkbox"/> Support Informal Learning	
		<input type="checkbox"/> Others (Specify: _____)	

		<input type="checkbox"/> Not Stated	
A11	Warranty	<input type="checkbox"/> Warranty provided <input type="checkbox"/> No warranty is available	

Section B: Assessment of MLM**ANALYSIS****CONTENT**

No	Quality Indicator	Descriptor	Quality Measures				
B1	Desired learning outcomes (LO) are clearly stated.	1 = Main LO. not stated 2 = Main LO. stated but not clear 3 = Main LO. is clear 4 = Main LO and sub-LO are stated 5 = Main LO and sub-LO are very clearly stated.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B2	Content meets objectives.	1 = Deviates from the objs. 2 = Partially met 3 = Meet key objs. 4 = Meet all objs. 5 = Meets all obj. and more	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B3	Coverage/scope of the content is sufficient.	1 = Totally insufficient. 2 = Partially sufficient 3 = Meet min. requirement 4 = More than sufficient 5 = More than sufficient with additional activities	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B4	Content is reliable.	1 = No user reference site is available 2 = 1-3 user reference sites are listed 3 = 4-6 user reference sites are listed 4 = 7-9 user reference sites are listed 5 = More than 9 reference sites are listed	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B5	Content is original (Copyright law).	1 = Content infringe copyright law 2 = Content is not original 3 = Content follows fair-use policy 4 = Content is original 5 = Content is original and unique	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

LEARNER							
B6	Pre-Requisite are stated.	1 = Not stated 2 = Stated but not clear 3 = Stated and clear 4 = Stated in detail & clear 5 = Stated in detail, clearly & evaluated (pre-test)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B7	Rating of the overall learning experience of the learners.	1 = Very Poor 2 = Poor 3 = Average 4 = Good 5 = Excellent	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
DESIGN							
INSTRUCTIONAL DESIGN APPLICATION							
B8	The content is interactive.	1 = No interaction 2 = Limited interactions provided 3 = Some interaction provided 4 = Many interactions provided 5 = many interesting interactions provided (e.g. Simulation and game-based learning)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B9	The interface is user-friendly (i.e. familiar & consistent).	1 = Interface is totally not user-friendly (i.e. user need to use manual extensively or require many hours of training) 2 = Some parts of interface is user-friendly 3 = Interface is generally user-friendly 4 = Interface is user-friendly 5 = Interface is very user-friendly (i.e. users need not use manual or require training)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

B10	The MLM promotes collaborative learning.	1 = Promotes individual Learning 2 = Some interaction with instructor. 3 = Interaction with peer/instr. 4 = Group activities are provided 5 = Many group activities are provided with opportunity for knowledge construction.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B11	The instructional Design Strategies are effective.	1 = Not effective 2 = Has some impact on learner 3 = Average impact on learner 4 = Effective 5 = Very effective	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B12	The MLM has good aesthetics values. <i>(The results of good aesthetics is engagement/interest)</i>	1 = Content is boring 2 = Some of the content are boring 3 = Content is generally interesting 4 = Content is interesting 5 = Content creates high level of interest & engagement	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B13	Different learning styles/approaches are used (diversity).	1 = No specific learning approach is used 2 = Only one learning approach is used 3 = 2-3 different learning approaches are used 4 = Few different learning approaches are used 5 = Many different learning approaches are used.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B14	The use of technology is appropriate.	1 = Wrong technology is applied 2 = Some mis-match in technology 3 = Tech. applied is generally appropriate 4 = Tech. applied is appropriate 5 = Tech. is very appropriate	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
EVALUATION STRATEGY							
B15	Assessment is included.	1 = No assessment conducted 2 = Assessment covers only some of the learning outcomes 3 = Assessment (lower level of Blooms) covers all learning outcomes.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

		<p>4 = Assessment (mid-level of Blooms) covers all learning outcomes with feedback</p> <p>5 = Excellent assessment (i.e. higher level of Blooms) covering all learning outcomes with constructive feedback.</p>					
TECHNICAL CONFORMANCE							
B16	Degree of conformance to SCORM Standards.	<p>1 = Does not comply</p> <p>2 = Does not comply but SCO concept is used</p> <p>3 = Comply with min. requirement (i.e. LMSInitialise & LMSFinish) & packaging</p> <p>4 = Comply & used few data model & packaging</p> <p>5 = Comply and uses many data model & packaging</p>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B17	Degree of conformance to Web Standards.	<p>1 = Does not conform</p> <p>2 = Partial conformance</p> <p>3 = Generally conform</p> <p>4 = Strictly conforms but adopts older version (i.e. Web 1.0)</p> <p>5 = Strictly conforms and adopts current version (i.e. Web 2.0)</p>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B18	Degree of adoption to Open Standards.	<p>1 = Content is strictly proprietary (i.e. use specific software to operate)</p> <p>2 = Content is strictly proprietary but operates on open tools (e.g. std. browser)</p> <p>3 = Generally adopts Open Standards (e.g. client adopts open standards but not server)</p> <p>4 = Strictly adopts Open Standards (e.g. client and server adopts Open Standards)</p> <p>5 = Strictly adopts Open Standards and have free access to source files.</p>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

DEVELOPMENT							
MULTIMEDIA CONTENT							
B19	The use of fonts and color are appropriate.	1 = Not readable 2 = Readable but create stress on eyes 3 = Readable 4 = Readable and consistent 5 = Readable consistent and customizable (i.e. fonts/colours can be changed by users)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B20	Language is appropriate to target audience.	1 = Totally not appropriate (i.e. Too high level, too many mistakes, heavy accent, etc) 2 = Not Appropriate (High level, some mistakes, some accent, etc) 3 = Acceptable (Average level, few mistakes, no accent, etc) 4 = Appropriate (simple, minor mistakes, clear voice-over, etc.) 5 = Very appropriate (simple, no mistakes, very clear voice-over, etc.)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B21	Easy to understand the content.	1 = Diff to understand 2 = Some are diff to understand 3 = Able to understand 4 = Easy to understand 5 = Easy to understand & related to real world examples	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B22	Content is accurate and factual.	1 = Mostly Misrepresented 2 = Some misrepresentation 3 = Clearly represented 4 = Clearly represented and accurate 5 = Clearly represented, accurate & current	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B23	Presentation of content is structured/organised.	1 = Not structured 2 = Semi-structured 3 = Structured 4 = Well Structured 5 = Well Structured & provide site map	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B24	The content does not bias. (Gander, race, religion, culture, localisation, etc.)	1 = Content is very bias 2 = Content has some element of biasness 3 = Content is acceptable 4 = Content is not bias	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

		5 = Content is not bias & widely accepted					
IMPLEMENTATION							
SYSTEM REQUIREMENT							
B25	Accessibility of the content.	1 = Most of the content are not accessible (e.g. broken links, poor response time = > 5min. to load a page) 2 = some of the content are accessible 3 = Most of the content is accessible 4 = All content are accessible 5 = All content are accessible with good response time (<10s)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
USAGE AND SUPPORT							
B26	Clear instructions are available on how to use the content.	1 = No instructions provided (i.e. very difficult to use) 2 = Some instructions provided 3 = Most instructions provided 4 = All necessary inst. provided 5 = All necessary inst. provided with additional help tools (i.e. very easy to use)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B27	The support is available.	1 = No support is provided 2 = Some support is provided (e.g. via e-mail) 3 = Support is available with good response time (e.g. feedback within a day) 4 = Immediate support is available during office hours 5 = 24 x7 immediate support is available	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
B28	It provides support for special needs (i.e. handicap).	1 = No support 2 = Little support 3 = Some support 4 = Good support 5 = Good support for diff. handicap people	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

EVALUATION							
EVALUATION							
B29	Content has been endorsed/verified by SME.	1 = No verification 2 = Verified by non-SME 3 = Verified by SME (e.g. a teacher) 4 = Verified by experienced SME (e.g. teacher with >5 years experience) 5 = Verified by more than one experienced SME.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
PRODUCT UPDATES							
B30	Upgrades are available.	1 = No upgrade is available 2 = Upgrade available but once in two years 3 = Yearly upgrade is available 4 = Quarterly/biannual upgrade available 5 = Auto-upgrade features included.	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

Way Forward

The present document has attempted the definition of a quality assurance and assessment framework. This needs to be taken further, for a wider acceptance by the developers of multimedia learning materials, in Industry, Educational institutions as well as various other stakeholders.

Since different players in the Industry adopt different processes, the application of a generic framework needs to be **validated** in a variety of real life situations. This will be done by the application of framework in the Industry as well as retrofitting to existing processes and practices. This may lead to some modifications and fine tuning of the framework as well as adding weightages to the quality indicators.

The finalized framework would be widely **shared** with the Industry and other stakeholders to highlight the advantages of adopting such quality assurance processes. To maximize participation and make the process inclusive, the framework will be put on collaborative content creating networks like wiki educator in addition to conducting joint pilot projects, discussions, seminars and workshops.

Simultaneously, it will be essential to define the **documentation** required to assess the processes followed. Documentation would be the key to any assessment process and standardization of documentation is also essential.

Logically, an assessment process is expected to lead towards a **certification**. However, as this does not fall under COL-CEMCA's current mandate or existing capacity, what COL would do to encourage widespread use of the guidelines as part of its overall commitment to quality assurance, would be (i) to hold regional workshops throughout the Commonwealth, (ii) build capacity in the implementation of the Guidelines where required and (iii) do quality audits, if invited which could be a fee-for-service activity. The true impact of this collaborative work on the quality of multi-media content of course, will depend on how many professionals and institutions take ownership of this and make it an integral part of their own quality assurance process.